

An Outrigger Component for a Deployable Occulter System, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



ABSTRACT

In Phase II, Rocco proposes to build upon the results of Phase I to increase the technology readiness level (TRL) of the NASA JPL deployable external occulter. An occulter, which is a satellite flying far from a telescope and employing a large screen or, starshade, to suppress the incoming starlight, is used for detecting and characterizing exoplanets. Detecting Earthlike planets existing within the habitable zones of nearby stars is a key element of NASA's space exploration mission. The NASA JPL starshade incorporates a deployable center ring-truss as a hub and flower-like petals that wrap around the hub for packaging. As a result, it exhibits exceptionally challenging deployment kinematics. Rocco's Phase II will contribute to maturing the design of the NASA JPL deployable starshade through system and component design and analysis and supporting ground-demo hardware thereby helping to position it for spaceflight should it be transitioned to a NASA flight mission. Rocco's broad Phase II focus is on maturing each of the deployable starshade system elements that support the petals including the unfurling control system, the launch control system, and the deployed strut system. Innovative solutions have been conceptualized for each of these petal support functions as part the Phase I program. In Phase II, Rocco will emphasize developing and demonstrating the proposed petal unfurling technology culminating in a 1/3 scale fully functional and motorized hardware demonstration with 30 petal simulators, 3 of them being instrumented and strength-representative (e.g. fragile and narrow petal tips). Rocco will also further develop the launch control system and deployed strut-support system through extensive design and analysis.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: The primary NASA application target for the proposed Phase II program is the

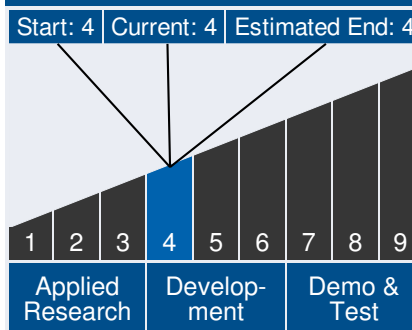


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Technology Maturity



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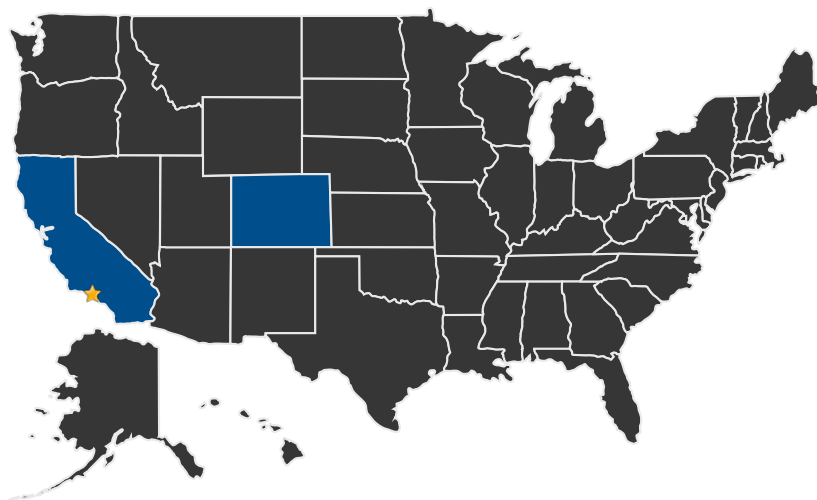


deployable starshade currently under development by NASA JPL. Thus if successful, the results of Phase II will help to increase the maturity of the system thereby positioning it for transition to flight. Beyond this application, Rocco anticipates the creation enabling intellectual property capable of transitioning into other NASA space deployable structure systems.

To the commercial space industry:

Potential Non-NASA Commercial Applications: Similar to other NASA applications, the results of Phase II may be transitioned into other commercial and military space deployable systems. Further, Rocco is investigating a number of other terrestrial markets that could make use of the company's deployable structure products (including those proposed for development herein). Examples include deployable shelters and man-packable systems.

U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States
With Work

★ Lead Center:
Jet Propulsion Laboratory

Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Project Manager:

- Robert Jones

Principal Investigator:

- William Francis

Technology Areas

Primary Technology Area:

Science Instruments,
Observatories, and Sensor
Systems (TA 8)

- └ Remote Sensing Instruments
and Sensors (TA 8.1)
 - └ Optical Components (TA
8.1.3)
 - └ Occulter (TA 8.1.3.2)

Secondary Technology Area:

Science Instruments,
Observatories, and Sensor
Systems (TA 8)

- └ Observatories (TA 8.2)
 - └ Structures and
Antennas (TA 8.2.2)

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Other Organizations Performing Work:

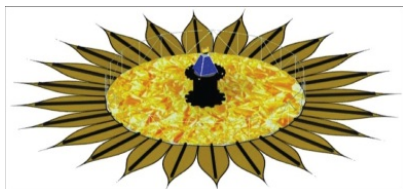
- ROCCOR, LLC (Louisville, CO)

PROJECT LIBRARY

Presentations

- Briefing Chart
 - (<http://techport.nasa.gov:80/file/23093>)
- Final Summary Chart
 - (<http://techport.nasa.gov:80/file/23814>)

IMAGE GALLERY



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DETAILS FOR TECHNOLOGY 1

Technology Title

An Outrigger Component for a Deployable Occulter System

Potential Applications

The primary NASA application target for the proposed Phase II program is the deployable starshade currently under development by NASA JPL. Thus if successful, the results of Phase II will help to increase the maturity of the system thereby positioning it for transition to flight. Beyond this application, Roccor anticipates the creation enabling intellectual property capable of transitioning into other NASA space deployable structure systems.